REMARKS

Applicant thanks the examiner for a thorough search. By this amendment, the abstract,

the title, and the claims 1, 3, 12, 13, 21, 23, 24, 33, and 35 are amended. Claims 22 and 34 are

canceled. Claim 36 is added. Claims 1-21 and 23-35 are pending in the application.

Claims 3, 13, 23, and 35 have been amended to improve their readability. The

amendment of claims 3, 13, 23, and 35 is unrelated to patentability.

I.   35 USC §112, FIRST PARAGRAPH

Claims 1-21, 23-33 and 35 are rejected under 35 USC §112, first paragraph, as allegedly

failing to comply with the written description requirement.

The Office Action stated,

All embodiments describe storing (retaining) the number of duplicate
acknowledgements....not storing the actual duplicate acknowledgements....

Independent claims 1, 12, and 33 have been amended to recite

determining and retaining, upon receiving acknowledgement of receipt of new data, an
excess number of duplicate acknowledgements, wherein the excess number of
duplicate acknowledgements is a number that represents an amount of duplicate
acknowledgements and is based upon a count of consecutive duplicate
acknowledgement packets

Independent claim 21 has a similar amendment. This amendment clarifies that the excess

number is not the actual duplicate acknowledgements, thereby obviating the rejection. The

rejection to dependent claims 2-20, 23-32, and 35 is similarly obviated by the amendment to

independent claim 1, 12, 21, and 33, from which they depend.

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REQUEST FOR WITHDRWAL OF THE FINALITY OF THE REJECTION

The Office Action based its new rejection under 35 USC §112, first paragraph, on the usage of the phrase "number of duplicate acknowledgements". However, this phrase was in the originally filed claims. Although the claims originally recited, "storing said excess number of duplicate acknowledgements as a number of duplicate acknowledgements", this line merely defines one "number of duplicate acknowledgements" as "a number of duplicate acknowledgements". The rejection is not based on prior art. The new ground of rejection under 35 USC §112, first paragraph, was not necessitated by the amendment or information in an information disclosure statement. Therefore, the finality of the rejection is improper according MPEP 707.06(a), which states,

> Under present practice, second or any subsequent actions on the merits shall be final, *except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement* filed during the period set forth in 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p).... (Emphasis added).

Therefore, in view of the above, the finality of the Office Action should be withdrawn, because the rejection under 35 USC §112, first paragraph, was not necessitated by amendment.

II.   ISSUES RELATING TO PRIOR ART

A. STATUS OF CLAIMS

Claim 20 is rejected as allegedly anticipated by RFC 2582.

Claims 1, 2-8, 11-16, 19, and 33 are rejected as being allegedly upatentable over RFC 2582 in view of Lackshman et al.

Claims 2, 9-10, 17, 18, 21-32, 34, and 35 are rejected as being allegedly upatentable over RFC 2582 in view of Lackshman et al. further in view of Chapman.

Claim 34 is rejected as being allegedly upatentable over RFC 2582 in view of Chapman.

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B CLAIMS 20 AND 34

Claims 20 and 34 are cancelled, thereby obviating the rejection of these claims.

C.1   INDEPNDENT CLAIMS 1, 12, 21, 33 AND 35

RFC2582 modifies the algorithm RFC2581 for handling a partial Ack when received

during Fast Recovery.   A partial Ack acknowledges data not previously acknowledged, but does

not acknowledge everything sent so far. The purpose of the claimed invention is to change the

handling Duplicate Acks, which are Acks that do not acknowledge any new data. The RFC2582

may work well together the methods claimed in this application. However, the methods claimed

in this application are nonetheless essentially independent.

The Office Action stated,

> RFC2582 dislcoses ... determining.. upon receiving acknowledgement of receipt
> of new data, an excess number of duplicate acknowledgements based upon a count of
> consecutive duplicate acknowledgement packets (section 3 "The Fast Retransmit and Fast
> Recovery Algorithms in NewReno", lines 8-13 of section 3 where an excess number of
> duplicate ACKs is the same as receiving 3 duplicate ACKs because when 3 duplicate
> ACKs are received, the threshold has been met in excess and the "Fast Recovery
> procedure" begins)....

The Applicants disagree. The Office Action interprets the phrase "excess number of duplicate

acknowledgements" as referring to a count of duplicate acknowledgements when discussing the

"determining". However, the Office Action also stated,

> Lakshman discloses "..retaining.." the duplicate ACKs as they are received (figure
> 1 shows a buffer 30 that stores the ACK packets before they are transmitted, it is inherent
> that the Source of the data packets have an ACK receiving buffer to accommodate the
> transmission of the ACKs from the Destination buffer 30, this is not only true with the
> ACKs but also true with the data packets as can be seen with the Source data packet
> buffer of figure 1 and the Destination packet buffer 97 of figure 2, i.e. the Source has a
> data packet transmit buffer and the Destination has a data packet receive buffer to
> accommodate the transmission of packets, since the ACKs are no different, in terms of
> general packet transmission, they must have the same buffer system).

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The Applicants disagree. The Office Action interprets the phrase "excess number of duplicate acknowledgements" as referring to the actual duplicate acknowledgements when discussing the "retaining". However, claims 1, 12, and 33 recite, "determining and retaining ... an excess number of duplicate acknowledgements". Similarly, in claims 21 and 35, "said excess number of duplicate acknowledgements" relies on the "excess number of duplicate acknowledgements" of the determining step for antecedent basis. Thus, in claims 1, 12, 21, 33, and 35, the same "excess number of duplicate acknowledgements" that are determined are also retained. The interpretation of the Office Action, in which the determining is of the number of duplicate acknowledgements and the retaining is of the actual duplicate acknowledgements is therefore incorrect. Thus, the Office Action has not shown a determining and retaining of the same "excess number of duplicate acknowledgements", but instead only alleges to show determining the value of "excess number of duplicate acknowledgements" (e.g., how many) and retaining the actual duplicate acknowledgements.

The Office Action relies on section 3, lines 7-13, of RFC 2582 for teaching determining the number of excess duplicate acknowledgements. Additionally the prior Office Action relied upon this section for a teaching of storing the number of excess duplicate acknowledgements. Section 3 states

> The modification defines a "Fast Recovery procedure" that begins when three duplicate ACKs are received and ends when either a retransmission timeout occurs or an ACK arrives that acknowledges all of the data up to and including the data that was outstanding when the Fast Recovery procedure began.

> 1. When the third duplicate ACK is received and the sender is not already in the Fast Recovery procedure, set ssthresh to no more than the value given in equation 1 below. (This is equation 3 from [**RFC 2581**]).

> $$ssthresh = max \ (FlightSize \ / \ 2, \ 2*MSS) \qquad (1)$$

> Record the highest sequence number transmitted in the variable "recover".

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Although section 3 discusses initiating a fast recovery when three ACKs are received, the initiation of the fast recovery is upon receiving three "*duplicate* ACKs" (emphasis added). A duplicate ACK is by definition an ACK that was already sent, and is therefore not new data but is related to (or is) old data. However, the determining (of claims 1, 12, 21, 33, and 35) is performed upon receiving "new data", which is not disclosed in section 3. Finally, claims 1, 12, 21, 33, and 35 recite the determination being based on a count of "consecutive" duplicate acknowledgements, while in contrast section 3 does not mention anything about the duplicate ACKs being "consecutive".

Upon receiving "new data", the course of action taken by RFC 2582 is discussed in step 5 (and not in section 3, lines 7-3). Step 5 states,

5. When an ACK arrives that acknowledges *new data*, this ACK could be the acknowledgment elicited by the retransmission from step 2, or elicited by a later retransmission.

If this ACK acknowledges all of the data up to and including "recover", then the ACK acknowledges all the intermediate segments sent between the original transmission of the lost segment and the receipt of the third duplicate ACK. Set cwnd to either (1) min (ssthresh, FlightSize + MSS); or (2) ssthresh, where ssthresh is the value set in step 1; this is termed "deflating" the window. (We note that "FlightSize" in step 1 referred to the amount of data outstanding in step 1, when Fast Recovery was entered, while "FlightSize" in step 5 refers to the amount of data outstanding in step 5, when Fast Recovery is exited.) If the second option is selected, the implementation should take measures to avoid a possible burst of data, in case the amount of data outstanding in the network was much less than the new congestion window allows [HTH98]. Exit the Fast Recovery procedure.

If this ACK does *not* acknowledge all of the data up to and including "recover", then this is a partial ACK. In this case, retransmit the first unacknowledged segment. Deflate the congestion window by the amount of *new data* acknowledged, then add back one MSS and send a new segment if permitted by the new value of cwnd. This "partial window deflation" attempts to

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ensure that, when Fast Recovery eventually ends, approximately ssthresh amount of data will be outstanding in the network. Do not exit the Fast Recovery procedure (i.e., if any duplicate ACKs subsequently arrive, execute Steps 3 and 4 above).

For the first partial ACK that arrives during Fast Recovery, also reset the retransmit timer. (Emphasis added)

Step 5 discusses what action to take depending upon whether the ACK for new data acknowledges all of the data up to the recover variable. However, there is no discussion in step 5 of retaining or determining an excess number of duplicate acknowledgments that is based on a count of consecutive duplicate acknowledgements upon receiving "new data".

Regarding claims 1, 12, 21, 33, and 35, RFC 2582 discusses two variables, which are "recover" and "send_high". Recover stores the highest sequence number sent at the time that a third duplicate acknowledgement is received. Send_high stores that highest sequence number sent after a timeout. However neither of these variables is the "excess number of duplicate acknowledgements", which "<u>is a number that represents an amount of duplicate acknowledgements and is</u> based upon a count of consecutive duplicate acknowledgement packets". Specifically, both recover and send_high are sequence numbers of packets. Neither recover nor send_high is a number representing how many acknowledgement packets are received.

Further, in section 5, (after receiving "new data") RFC 2582 discusses receiving acknowledgements that "cover" the packets having the sequence numbers of send_high, but does not discuss "determining" any particular number of duplicate acknowledgments that might be associated with send_high. Thus RFC 2582 lacks the claimed determining step performed upon receipt of new data.

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Lakshman et al. was cited to show retaining the actual duplicate acknowledgements. However, Lakshman et al. does not show "retaining, upon receiving acknowledgement of receipt of new data, an excess number of duplicate acknowledgements...*based upon a count of consecutive duplicate acknowledgement packets*" (emphasis added). The storage of Lakshman et al. (even when combined with RFC 2582) is performed indiscriminately as a result of receiving the duplicate acknowledgements in a buffer, regardless of any "count" of "consecutive" duplicate acknowledgements. Additionally, since Lakshman et al. do not teach retaining a count of the duplicate acknowledgements, Lakshman et al. do not teach

> determine, upon receiving acknowledgement of receipt of new data, an excess number of duplicate acknowledgements based upon a count of consecutive duplicate acknowledgement packets;
> retain said excess number of duplicate acknowledgements in said memory....

Similarly, Lakshman et al. do not teach

> determining and retaining, upon receiving acknowledgement of receipt of new data, an excess number of duplicate acknowledgements, wherein the excess number of duplicate acknowledgements is a number that represents an amount of duplicate acknowledgements and is based upon a count of consecutive duplicate acknowledgement packets....

Retaining actual duplicate acknowledgements was never claimed.

C.2 INDEPENDENT CLAIMS 1, 12, AND 33

Claims 1, 12, and 33 additionally require that the "retaining" is performed "upon receipt of new data". The Office Action fails to show that both the "retaining" and "determining" are performed with respect to the same "excess number of duplicate acknowledgements". Further, the Office Action has not shown retaining the excess number of duplicate acknowledgements "upon receiving acknowledgement of receipt of new data". The Office Action's reliance on section 3, lines 7-13, of RFC 2582 for teaching determining the number of excess duplicate acknowledgements is incorrect. Section 3 discusses that the initiation of the fast recovery is

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upon receiving three "*duplicate* ACKs" (emphasis added), i.e. not new data or old data. Thus, the "retaining is not performed in response to receipt of new data. In contrast, in claims 1, 12, and 33, the retaining is performed upon receiving "new data", which is not disclosed in section 3.

Regarding step 5 and claims 1, 12, and 33, although RFC 2582 is based on RFC 2581, which has an option of storing a number of duplicate acknowledgements received, in RFC 2581 this information is lost upon receiving new data. RFC 2582 does not describe, "retaining" any particular of duplicate acknowledgments that might be associated with send_high. Instead, RFC 2582 discusses receiving acknowledgements that "cover" the packets having the sequence numbers of send_high. RFC 2582 only teaches storing sequence numbers (in the recover and send_high variables) and does not teach or suggest, upon receipt of new data, storing or retaining a number representative of how many duplicate acknowledgements were received.

B. DEPENDENT CLAIMS

The Office Action does not allege that Chapman et al. correct the above deficiencies in RFC 2582 or in the combination of RFC 2582 and Lakshman et al. Each of claims 2-11, 13-19, and 22-32 depends upon one or more of independent claims 1, 12, and 21 and is allowable for at least the same reasons. Although each of the remaining dependent claims 2-11, 13-19, and 22-32 contain features that are separately patentable over the claims from which they depend, in view of the patentability of the independent claims, the remaining dependent claims and other features are not further argued at this time to expedite prosecution. Additionally, many of the claims argued contain other independently patentable features that are not separately argued at this time to expedite the prosecution.

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D. NEW CLAIM 36

New claim 36 recites two determining steps. One determining step determines a number of duplicate acknowledgements were received and the other determining step determines an excess number of duplicate acknowledgements received. Claim 36 also recites a of list recovery actions that the method is capable of performing. The Office Action has not demonstrated that the method of RFC 2582 taken alone or as modified by Lakshman et al. and/or Chapman et al. includes each of the recovery actions listed and performs both determining steps. Additionally, there are many other features in claim 36 that the Office Action has not alleged to be shown by RFC 2582 taken alone or as modified by Lakshman et al. and/or Chapman et al.

III.   CONCLUSIONS & MISCELLANEOUS

For the reasons set forth above, all pending claims are patentable over the art of record. Accordingly, allowance of all claims is hereby respectfully solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

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No extension fee is believed to be due. However, to the extent necessary, Applicants

petition for an extension of time under 37 C.F.R. § 1.136. The Commissioner is authorized to

charge any fee that may be due in relation to this application to our Deposit Account No. 50-

1302.

Respectfully submitted,

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